

AMENDMENTS TO THE CLAIMS

1. (Currently amended) Display driver control circuitry for controlling a display driver for an electroluminescent display, the display comprising at least one a plurality of electroluminescent display elements, the driver including at least one a plurality of substantially constant current generators for simultaneously driving said plurality of driving the display elements, each said constant current generator being configured for regulating the current on an associated display drive line driving a set of said electroluminescent display elements, the display driver control circuitry comprising:

a drive voltage sensor for sensing a voltage on a first line in which the current is regulated by said constant current generator; and

a voltage controller coupled to said drive voltage sensor for controlling the voltage of a supply for said constant current generator in response to said sensed voltage, and configured to control said supply voltage to increase the efficiency of said display driver;

wherein said voltage controller is configured to reduce said supply voltage when this will not substantially reduce said regulated current and/or said display brightness; and said voltage controller is configured to control said supply voltage such that said constant current generator operates in the vicinity of said constant current generator's compliance limit

a drive voltage sensor for sensing the voltage on each said display drive line;

a maximum voltage detector to detect a maximum voltage of said drive line sensed voltages;

a difference detector to detect a difference between said maximum voltage and said supply voltage; and

a comparator to compare said difference with a threshold defining an estimated said compliance limit of a said constant current generator; and

wherein said voltage controller is responsive to an output of said comparator to control said supply voltage such that a said constant current generator driving said drive line having said detected maximum voltage operates in the vicinity of the compliance limit of the said constant current generator.

2. (Canceled)

3. (Canceled)

4. (Previously presented) Display driver control circuitry as claimed in claim 1, further comprising means to determine a compliance limit for use by said voltage controller.

5. (Previously presented) Display driver control circuitry according to claim, 1 further comprising a supply voltage sensor for sensing said supply voltage, and means to determine a difference between said supply voltage and said first line voltage, and wherein said voltage controller is configured to control said supply voltage responsive to said difference.

6. (Canceled)

7. (Canceled)

8. (Currently amended) Display driver control circuitry according to claim [[6]] 1, wherein said display comprises a passive matrix display, and wherein said voltage controller is configured to control said supply voltage on a frame-by-frame basis.

9. (Currently amended) Display driver control circuitry according to claim [[6]] 1, wherein said display comprises a passive matrix display having a plurality of rows of display elements, and wherein said voltage controller is configured to control said supply voltage on a row-by-row basis.

10. (Previously presented) Display driver control circuitry according to claim 1 wherein said display has at least one control line for controlling the illumination of said at least one electroluminescent display element, wherein said drive voltage sensor is configured to sense the voltage on said display control line, and wherein said voltage controller has an output for controlling an adjustable power supply configured for providing said supply voltage.

11. (Previously presented) A display driver including the display driver control circuitry of claim 1.

12. (Previously presented) Display driver control circuitry as claimed in claim 1 wherein said electroluminescent display element comprises an organic light emitting diode.

13. (Currently Amended) A method of reducing the power consumption of a display driver driving an electroluminescent display, the display comprising ~~at least one a plurality of~~ electroluminescent display elements, the driver including ~~at least one a plurality of~~ substantially constant current generators for simultaneously driving ~~said~~ plurality of the display elements, ~~each said constant current generator being configured for regulating the current on an associated display drive line driving a set of said electroluminescent display elements, the display and~~ having a power supply for supplying power at a supply voltage for said current generators, the method comprising:

sensing a voltage on ~~each said display drive a first line coupled to each respective said~~ the current generator; ~~the current in which first line is regulated by the current generator;~~ and

controlling said supply voltage responsive to said sensed voltage to reduce said supply voltage when a reduction may be made without substantially altering said regulated current and such that said constant current generator operates in the vicinity of said constant current generator's compliance limit; and

wherein said controlling comprises:

detecting a maximum voltage of said drive line sensed voltages;
determining a difference between said maximum voltage and said supply
voltage;
comparing said difference with a threshold defining an estimated said
compliance limit of a said constant current generator; and
controlling said supply voltage using an output of said comparing such that a
said constant current generator driving said drive line having said detected maximum voltage
operates in the vicinity of the compliance limit of the said constant current generator.

14. – 19. (Canceled)

20. (Previously presented) A method according to claim 13, wherein a said substantially constant current generator comprises a current source.

21. (Previously presented) A method according to claim 13, wherein a said substantially constant current generator comprises a current sink.

22. (Previously presented) A method according to claim 13, wherein said display comprises a passive matrix display having a plurality of electroluminescent display elements and a plurality of row electrodes and a plurality of column electrodes for addressing said display elements, and wherein said driver is coupled to at least one of said plurality of row electrodes and said plurality of said column electrodes for driving said display.

23. (Previously presented) A method according to claim 22 comprising performing said sensing and controlling on a row-by-row basis.

24. (Previously presented) A method according to claim 22 comprising performing said sensing and controlling on a frame-by-frame basis.

25. (Previously presented) A method according to claim 13, wherein a said electroluminescent display element comprises an organic light emitting diode.

26. (Previously presented) A carrier carrying processor control code to implement the method of claim 13.

27. (Previously presented) Display driver circuitry configured to implement the method of claim 13.

28. & 29. (Canceled)

30. (New) Display driver control circuitry for controlling a display driver for an electroluminescent display, the display comprising a plurality of electroluminescent display elements, the driver including a plurality of substantially constant current generators for simultaneously driving said plurality of display elements, each said constant current generator being configured for regulating the current on an associated display drive line driving a set of said electroluminescent display elements, the control circuitry comprising:

a drive voltage sensor for sensing a voltage on a first line in which the current is regulated by said constant current generator; and

a voltage controller coupled to said drive voltage sensor for controlling the voltage of a supply for said constant current generator in response to said sensed voltage, and configured to control said supply voltage to increase the efficiency of said display driver;

wherein said voltage controller is configured to reduce said supply voltage when this will not substantially reduce said regulated current and/or said display brightness, and said voltage controller is configured to control said supply voltage such that said constant current generator operates in the vicinity of said constant current generator's compliance limit; and

wherein a said constant current generator comprises a bipolar transistor connected in series between a said drive line and a supply voltage line providing said supply voltage to said constant current generator, and wherein said bipolar transistor has an emitter terminal directly connected to said supply voltage line.

31. (New) Display driver control circuitry for controlling a display driver for an electroluminescent display, the display comprising a plurality of electroluminescent display elements, the driver including a plurality of substantially constant current generators for simultaneously driving said plurality of display elements, each said constant current generator being configured for regulating the current on an associated display drive line driving a set of said electroluminescent display elements, the control circuitry comprising:

a drive voltage sensor for sensing a voltage on a first line in which the current is regulated by said constant current generator; and

a voltage controller coupled to said drive voltage sensor for controlling the voltage of a supply for said constant current generator in response to said sensed voltage, and configured to control said supply voltage to increase the efficiency of said display driver;

wherein said voltage controller is configured to reduce said supply voltage when this will not substantially reduce said regulated current and/or said display brightness, and said voltage controller is configured to control said supply voltage such that said constant current generator operates in the vicinity of said constant current generator's compliance limit; and

wherein a said constant current generator comprises a Wilson current mirror.

32. (New) Display driver control circuitry for controlling a display driver for an electroluminescent display, the display comprising a plurality of electroluminescent display elements, the driver including a plurality of substantially constant current generators for simultaneously driving said plurality of display elements, each said constant current generator being configured for regulating the current on an associated display drive line driving a set of said electroluminescent display elements, the control circuitry comprising:

a drive voltage sensor for sensing a voltage on a first line in which the current is regulated by said constant current generator; and

a voltage controller coupled to said drive voltage sensor for controlling the voltage of a supply for said constant current generator in response to said sensed voltage, and configured to control said supply voltage to increase the efficiency of said display driver;

wherein said voltage controller is configured to reduce said supply voltage when this will not substantially reduce said regulated current and/or said display brightness, and said voltage controller is configured to control said supply voltage such that said constant current generator operates in the vicinity of said constant current generator's compliance limit; and

a system to dynamically determine said compliance limit for controlling said supply voltage.

33. (New) Display driver control circuitry as claimed in claim 32 wherein said system to dynamically determine a said compliance limit comprises a system to find a knee in a current-voltage curve of a said constant current generator.

34. (New) A method of reducing the power consumption of a display driver driving an electroluminescent display, the display comprising a plurality of electroluminescent display elements, the driver including a plurality of substantially constant current generators for simultaneously driving said plurality of display elements, each said constant current generator being configured for regulating the current on an associated display drive line driving a set of said electroluminescent display elements, the display having a power supply for supplying power at a supply voltage for said current generators, the method comprising:

sensing a voltage on each said display drive line coupled to each respective said current generator; and

controlling said supply voltage responsive to said sensed voltage to reduce said supply voltage when a reduction may be made without substantially altering said regulated current

and such that said constant current generator operates in the vicinity of said constant current generator's compliance limit; and

wherein said controlling comprises dynamically determining a said compliance limit for controlling said supply voltage.